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Search Page 8

DATE: Saturday, July 12, 2003

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L6	L3 and @ay<1998	0	L6
L5	L2 same autocorrelation	20	L5
L4	L3 same autocorrelation	0	L4
L3	L2 same fret	71	L3
L2	fluorescence correlation spectroscopy	286	L2
L1	fluorescence correlation spectrscopy	0	L1

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NEWS 20	May 19	RAPRA enhanced with new search field, simultaneous left and right truncation
NEWS 21	Jun 06	Simultaneous left and right truncation added to CBNB
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=> s fluorescence correlation spectroscopy
L1 669 FLUORESCENCE CORRELATION SPECTROSCOPY

=> s l1 and fret
L2 13 L1 AND FRET

=> duplicate remove l2
DUPLICATE PREFERENCE IS 'MEDLINE, BIOSIS'
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PROCESSING COMPLETED FOR L2
L3 8 DUPLICATE REMOVE L2 (5 DUPLICATES REMOVED)

=> d 1-8 bib ab

L3 ANSWER 1 OF 8 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 2003:177363 BIOSIS
DN PREV200300177363
TI In vivo imaging.
AU Misteli, Tom
SO Methods (Orlando), (January 2003, 2003) Vol. 29, No. 1, pp. 1-2. print.
ISSN: 1046-2023.
DT Editorial
LA English

L3 ANSWER 2 OF 8 MEDLINE DUPLICATE 1
AN 2003246897 IN-PROCESS
DN 22654364 PubMed ID: 12770909
TI Single Molecule Detection of DNA Looping by NgoMIV Restriction Endonuclease.
AU Katiliene Zivile; Katilius Evaldas; Woodbury Neal W
CS Department of Chemistry and Biochemistry and the Center for the Study of Early Events in Photosynthesis, Arizona State University, Tempe, Arizona 85287-1604.
SO BIOPHYSICAL JOURNAL, (2003 Jun) 84 (6) 4053-61.
Journal code: 0370626. ISSN: 0006-3495.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS IN-PROCESS; NONINDEXED; Priority Journals
ED Entered STN: 20030529
Last Updated on STN: 20030529
AB Single molecule fluorescence resonance energy transfer (**FRET**) and **fluorescence correlation spectroscopy** were used to investigate DNA looping by NgoMIV restriction endonuclease. Using a linear double-stranded DNA (dsDNA) molecule labeled with a fluorescence donor molecule, Cy3, and fluorescence acceptor molecule, Cy5, and by varying the concentration of NgoMIV endonuclease from 0 to 3 x 10(-6) M, it was possible to detect and determine diffusion properties of looped DNA/protein complexes. **FRET** efficiency distributions revealed a subpopulation of complexes with an energy transfer efficiency of 30%, which appeared upon addition of enzyme in the picomolar to

P/4505.A1B537

nanomolar concentration range (using 10(-11) M dsDNA). The concentration dependence, fluorescence burst size analysis, and fluorescence correlation analysis were all consistent with this subpopulation arising from a sequence specific interaction between an individual enzyme and a DNA molecule. A 30% **FRET** efficiency corresponds to a distance of approximately 65 A, which correlates well with the distance between the ends of the dsDNA molecule when bound to NgoMIV according to the crystal structure of this complex. Formation of the looped complexes was also evident in measurements of the diffusion times of freely diffusing DNA molecules with and without NgoMIV. At very high protein concentrations compared to the DNA concentration, **FRET** and **fluorescence correlation spectroscopy** results revealed the formation of larger DNA/protein complexes.

L3 ANSWER 3 OF 8 MEDLINE DUPLICATE 2
AN 2002212927 MEDLINE
DN 21927632 PubMed ID: 11929999
TI Mg2+-dependent conformational change of RNA studied by fluorescence correlation and **FRET** on immobilized single molecules.
AU Kim Harold D; Nienhaus G Ulrich; Ha Taekjip; Orr Jeffrey W; Williamson James R; Chu Steven
CS Department of Applied Physics and Physics, Stanford University, Stanford, CA 94305-4060, USA.
NC GM53757 (NIGMS)
SO PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, (2002 Apr 2) 99 (7) 4284-9.
Journal code: 7505876. ISSN: 0027-8424.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 200204
ED Entered STN: 20020413
Last Updated on STN: 20020426
Entered Medline: 20020425
AB **Fluorescence correlation spectroscopy** (FCS) of fluorescence resonant energy transfer (**FRET**) on immobilized individual fluorophores was used to study the Mg2+-facilitated conformational change of an RNA three-helix junction, a structural element that initiates the folding of the 30S ribosomal subunit. Transitions of the RNA junction between open and folded conformations resulted in fluctuations in fluorescence by **FRET**. Fluorescence fluctuations occurring between two **FRET** states on the millisecond time scale were found to be dependent on Mg2+ and Na+ concentrations. Correlation functions of the fluctuations were used to determine transition rates between the two conformations as a function of Mg2+ or Na+ concentration. Both the opening and folding rates were found to vary with changing salt conditions. Assuming specific binding of divalent ions to RNA, the Mg2+ dependence of the observed rates cannot be explained by conformational change induced by Mg2+ binding/unbinding, but is consistent with a model in which the intrinsic conformational change of the RNA junction is altered by uptake of Mg2+ ion(s). This version of FCS/**FRET** on immobilized single molecules is demonstrated to be a powerful technique in the study of conformational dynamics of biomolecules over time scales ranging from microseconds to seconds.

L3 ANSWER 4 OF 8 MEDLINE DUPLICATE 3
AN 2003010503 MEDLINE
DN 22404570 PubMed ID: 12516859
TI Imaging protein-protein interactions in living cells.
AU Hink Mark A; Bisselin Ton; Visser Antonie J W G
CS MicroSpectroscopy Centre, Wageningen University, Dreijenlaan 3, 6703 HA Wageningen, The Netherlands.
SO PLANT MOLECULAR BIOLOGY, (2002 Dec) 50 (6) 871-83. Ref: 65

Journal code: 9106343. ISSN: 0167-4412.
CY Netherlands
DT Journal; Article; (JOURNAL ARTICLE)
General Review; (REVIEW)
(REVIEW, TUTORIAL)
LA English
FS Priority Journals
EM 200303
ED Entered STN: 20030109
Last Updated on STN: 20030311
Entered Medline: 20030310
AB The complex organization of plant cells makes it likely that the molecular behaviour of proteins in the test tube and the cell is different. For this reason, it is essential though a challenge to study proteins in their natural environment. Several innovative microspectroscopic approaches provide such possibilities, combining the high spatial resolution of microscopy with spectroscopic techniques to obtain information about the dynamical behaviour of molecules. Methods to visualize interaction can be based on **FRET** (fluorescence detected resonance energy transfer), for example in fluorescence lifetime imaging microscopy (FLIM). Another method is based on **fluorescence correlation spectroscopy** (FCS) by which the diffusion rate of single molecules can be determined, giving insight into whether a protein is part of a larger complex or not. Here, both **FRET**- and FCS-based approaches to study protein-protein interactions in vivo are reviewed.

L3 ANSWER 5 OF 8 MEDLINE DUPLICATE 4
AN 2002337357 MEDLINE
DN 22074795 PubMed ID: 12080140
TI Analysis of coupled bimolecular reaction kinetics and diffusion by two-color **fluorescence correlation spectroscopy**: enhanced resolution of kinetics by resonance energy transfer.
AU Hom Erik F Y; Verkman A S
CS The Graduate Group in Biophysics, Department of Medicine, Cardiovascular Research Institute, University of California, San Francisco, California 94143-0521, USA.. erikhom@cgl.ucsf.edu
NC EB00415 (NIBIB)
SO BIOPHYSICAL JOURNAL, (2002 Jul) 83 (1) 533-46.
Journal code: 0370626. ISSN: 0006-3495.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 200212
ED Entered STN: 20020625
Last Updated on STN: 20021228
Entered Medline: 20021227
AB In two-color **fluorescence correlation spectroscopy** (TCFCS), the fluorescence intensities of two fluorescently-labeled species are cross-correlated over time and can be used to identify static and dynamic interactions. Generally, fluorophore labels are chosen that do not undergo Forster resonance energy transfer (**FRET**). Here, a general TCFCS theory is presented that accounts for the possibility of **FRET** between reactants in the reversible bimolecular reaction, [reaction: see text] where k(f) and k(b) are forward and reverse rate constants, respectively (dissociation constant K(d) = k(b)/k(f)). Using this theory, we systematically investigated the influence on the correlation function of **FRET**, reaction rates, reactant concentrations, diffusion, and component visibility. For reactants of comparable size and an energy-transfer efficiency of approximately 90%, experimentally measurable cross-correlation functions should be sensitive to reaction kinetics for K(d) > 10(-8) M and k(f) >or= approximately 10(7) M(-1)s(-1). Measured auto-correlation functions

corresponding to donor and acceptor labels are generally less sensitive to reaction kinetics, although for the acceptor, this sensitivity increases as the visibility of the donor increases relative to the acceptor. In the absence of **FRET** or a significant hydrodynamic difference between reactant species, there is little effect of reaction kinetics on the shape of auto- and cross-correlation functions. Our results suggest that a subset of biologically relevant association-dissociation kinetics can be measured by TCFCS and that **FRET** can be advantageous in enhancing these effects.

L3 ANSWER 6 OF 8 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 2002:508600 BIOSIS
DN PREV200200508600
TI Detection trends in high throughput screening.
AU Westerfeld, John G. (1)
CS (1) BioWhittaker, Inc., Walkersville, MD, 21793: John.Westerfeld@biowhittaker.com USA
SO Analytical and Bioanalytical Chemistry, (January, 2002) Vol. 372, No. 1, pp. 43. http://link.springer.de/journals/abc. print. ISSN: 1618-2642.
DT Article
LA English

L3 ANSWER 7 OF 8 MEDLINE DUPLICATE 5
AN 2001290536 MEDLINE
DN 21267519 PubMed ID: 11373302
TI GFP imaging: methodology and application to investigate cellular compartmentation in plants.
AU Hanson M R; Kohler R H
CS Department of Molecular Biology and Genetics, Cornell University, Biotechnology Building, Ithaca, NY 14853, USA.. mrh5@cornell.edu
SO JOURNAL OF EXPERIMENTAL BOTANY, (2001 Apr) 52 (356) 529-39. Ref: 102 Journal code: 9882906. ISSN: 0022-0957.
CY England: United Kingdom
DT Journal; Article; (JOURNAL ARTICLE)
General Review; (REVIEW)
(REVIEW, TUTORIAL)
LA English
FS Priority Journals
EM 200108
ED Entered STN: 20010806
Last Updated on STN: 20010806
Entered Medline: 20010802
AB The cloning of the jellyfish gfp (green fluorescent protein) gene and its alteration for expression in subcellular locations in transformed plant cells have resulted in new views of intracellular organization and dynamics. Fusions of GFP with entire proteins of known or unknown function have shown where the proteins are located and whether the proteins move from one compartment to another. GFP and variants with different spectral properties have been deliberately targeted to separate compartments to determine their size, shape, mobility, and dynamic changes during development or environmental response. Fluorescence Resonance Energy Transfer (**FRET**) between GFP variants can discern protein/protein interactions. GFP has been used as a sensor to detect changes or differences in calcium, pH, voltage, metal, and enzyme activity. Photobleaching and photoactivation of GFP as well as **fluorescence correlation spectroscopy** can measure rates of diffusion and movement of GFP within or between compartments. This review covers past applications of these methods as well as promising developments in GFP imaging for understanding the functional organization of plant cells.

L3 ANSWER 8 OF 8 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 2001:448345 BIOSIS
DN PREV200100448345

TI **Fluorescence correlation spectroscopy** for in vivo monitoring of resistance mechanisms.
AU Schots, A. (1); Dees, R. (1); Goverse, A.; Borst, J. W. (1); Bakker, J.; Visser, A. J. W. G.
CS (1) Lab. of Molecular Recognition and Antibody Technology, Wageningen University, Wageningen Netherlands
SO Phytopathology, (June, 2001) Vol. 91, No. 6 Supplement, pp. S143. print.
Meeting Info.: Joint Meeting of the American Phytopathological Society, the Mycological Society of America, and the Society of Nematologists Salt Lake City, Utah, USA August 25-29, 2001
ISSN: 0031-949X.
DT Conference
LA English
SL English
AB Using **fluorescence correlation spectroscopy** (FCS) molecular interactions at the single-molecule level can be investigated. Molecular binding events and molecular processing can be measured. Important techniques in this respects are fluorescence resonance energy transfer (**FRET**) measured by fluorescence lifetime imaging microscopy (FLIM) and two colour fluorescence cross-correlation spectroscopy (FCCS). Using multiphoton lasers these techniques are now also applicable for measurements in plant cells. To gain insight in protein interactions usually protein fusions with yellow (YFP) and cyan (CFP) variants of the green fluorescent protein are used. These technologies are applied to gain insight in the resistance mechanism of the homologous resistance genes Rx and conferring resistance to potato virus X and Globodera pallida.

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     FILE 'MEDLINE, BIOSIS' ENTERED AT 13:53:58 ON 12 JUL 2003
L1           669 S FLUORESCENCE CORRELATION SPECTROSCOPY
L2            13 S L1 AND FRET
L3             8 DUPLICATE REMOVE L2 (5 DUPLICATES REMOVED)

=> s l1 and autocorrelation
L4           88 L1 AND AUTOCORRELATION

=> s l4 and py<1998
L5           30 L4 AND PY<1998

=> duplicate remove l5
DUPLICATE PREFERENCE IS 'MEDLINE, BIOSIS'
KEEP DUPLICATES FROM MORE THAN ONE FILE?  Y/(N):n
PROCESSING COMPLETED FOR L5
L6           19 DUPLICATE REMOVE L5 (11 DUPLICATES REMOVED)

=> d 1-19 bib ab

L6   ANSWER 1 OF 19     MEDLINE                              DUPLICATE 1
AN   97237213     MEDLINE
DN   97237213   PubMed ID: 9083691
TI   Dual-color fluorescence cross-correlation spectroscopy for multicomponent
     diffusional analysis in solution.
CM   Comment in: Biophys J. 1997 Apr;72(4):1487-8
AU   Schwille P; Meyer-Almes F J; Rigler R
CS   Department of Biochemical Kinetics, Max Planck Institute for Biophysical
     Chemistry, Gottingen, Germany.. pschwil@gwdg.de
SO   BIOPHYSICAL JOURNAL, (1997 Apr) 72 (4) 1878-86.
     Journal code: 0370626. ISSN: 0006-3495.
CY   United States
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DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 199709
ED Entered STN: 19970916
Last Updated on STN: 19970916
Entered Medline: 19970902
AB The present paper describes a new experimental scheme for following diffusion and chemical reaction systems of fluorescently labeled molecules in the nanomolar concentration range by fluorescence correlation analysis. In the dual-color fluorescence cross-correlation spectroscopy provided here, the concentration and diffusion characteristics of two fluorescent species in solution as well as their reaction product can be followed in parallel. By using two differently labeled reaction partners, the selectivity to investigate the temporal evolution of reaction product is significantly increased compared to ordinary one-color fluorescence **autocorrelation** systems. Here we develop the theoretical and experimental basis for carrying out measurements in a confocal dual-beam **fluorescence correlation spectroscopy** setup and discuss conditions that are favorable for cross-correlation analysis. The measurement principle is explained for carrying out DNA-DNA renaturation kinetics with two differently labeled complementary strands. The concentration of the reaction product can be directly determined from the cross-correlation amplitude.

L6 ANSWER 2 OF 19 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 1997:409481 BIOSIS
DN PREV199799701524
TI Exonuclease degradation of DNA studied by **fluorescence correlation spectroscopy**.
AU Foldes-Papp, Zeno; Thyberg, Per; Bjorling, Sofie; Holmgren, Arne; Rigler, Rudolf
CS Dep. Med. Biochem. and Biophysics, Karolinska Inst., S-17177 Stockholm Sweden
SO Nucleosides & Nucleotides, (1997) Vol. 16, No. 5-6, pp. 781-787.
ISSN: 0732-8311.
DT Article
LA English
AB Here we developed an accurate method for kinetic analysis of enzymatic degradation processes of double and/or single-stranded DNA/oligonucleotides using fluorescent reporter dyes. 217-bp DNA fragments were produced by polymerase chain reaction and cleaved by the 3' to 5' exonuclease activity of T7-DNA polymerase. The analysis of the products was performed by **Fluorescence Correlation Spectroscopy** measuring **autocorrelation** amplitudes and diffusion times. We give proof of (i) complete enzymatic degradation, (ii) retardation of complete enzymatic degradation by internally labelled Rhodamine-4-nucleotides and Cy5-nucleotides, respectively. Data evaluation by global analysis indicated first-order reaction kinetics with full-length DNA and free fluorescent nucleotides in the time window of measurements used.

L6 ANSWER 3 OF 19 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 1997:509788 BIOSIS
DN PREV199799808991
TI Kinetic investigations by **fluorescence correlation spectroscopy**: The analytical and diagnostic potential of diffusion studies.
AU Schwille, Petra (1); Bieschke, Jan; Oehlenschlaeger, Frank
CS (1) Max-Planck-Inst. Biophysikalische Chem., Abteilung Biochemische Kinetik, D-37077 Goettingen Germany
SO Biophysical Chemistry, (1997) Vol. 66, No. 2-3, pp. 211-228.
ISSN: 0301-4622.
DT General Review

LA English
AB This review demonstrates the large analytical and diagnostic potential of **fluorescence correlation spectroscopy** applied to freely diffusing biomolecules in solution. All applications discussed here in detail are based on changes in the diffusion characteristics of fluorescently labeled complementary strands of nucleic acids when they associate. However, the principle of the measurement can be extended to many different reactions with characteristic association times between several minutes up to several hours. If the reaction significantly affects the diffusion constants of at least one partner, single-color **autocorrelation** analysis is sufficient to extract kinetic parameters. If the observed binding process has only a moderate effect on diffusion coefficients, the detection selectivity and sensitivity can be improved by dual-color cross-correlation analysis. Finally, we show that diffusional analysis on the single-molecule level even opens up diagnostic applications, such as the detection of minute amounts of infectious agents like HIV-1 viruses in blood.

L6 ANSWER 4 OF 19 MEDLINE DUPLICATE 2
AN 96248303 MEDLINE
DN 96248303 PubMed ID: 8785359
TI Imaging **fluorescence correlation spectroscopy** : nonuniform IgE distributions on planar membranes.
AU Huang Z; Thompson N L
CS Department of Chemistry, University of North Carolina, Chapel Hill 27599-3290, USA.
NC GM-37145 (NIGMS)
SO BIOPHYSICAL JOURNAL, **(1996 Apr)** 70 (4) 2001-7.
Journal code: 0370626. ISSN: 0006-3495.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 199609
ED Entered STN: 19961008
Last Updated on STN: 19961008
Entered Medline: 19960920
AB **Fluorescence correlation spectroscopy** is useful for detecting and characterizing molecular clusters that are smaller than or approximately equal to optical resolution in size. Here, we report the development of an approach in which the pixel-to-pixel fluorescence fluctuations from a single fluorescence image are spatially autocorrelated. In these measurements, tetramethylrhodamine-labeled, anti-trinitrophenyl IgE antibodies were specifically bound to substrate-supported planar membranes composed of trinitrophenyl-aminocaproyldipalmitoylphosphatidylethanolamine and dipalmitoylphosphatidylcholine. The antibody-coated membranes were illuminated with the evanescent field from a totally internally reflected laser beam, and the fluorescence arising from the IgE-coated membranes was recorded with a cooled CCD camera. The image was corrected for the elliptical Gaussian shape of the evanescent illumination after background subtraction. The spatial **autocorrelation** functions of the resulting images generated two useful parameters: the extrapolated initial values, which were related to the average cluster intensity and density; and the correlation distances, which were related to the average cluster size. These parameters varied with the IgE density, and unlabeled polyclonal anti-IgE enhanced the nonuniform IgE distributions. The **autocorrelation** functions calculated from images of planar membranes containing fluorescently labeled lipids rather than bound, labeled IgE demonstrated that the spatial nonuniformities were prominent only in the presence of IgE. Fluorescent beads were used to demonstrate the principles and the methods.

L6 ANSWER 5 OF 19 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.

AN 1996:142313 BIOSIS
DN PREV199698714448
TI High order fluorescence fluctuation **autocorrelation** with imaging **fluorescence correlation spectroscopy**.
AU Vanden Broek, Willem; Huang, Zhengping; Thompson, Nancy L.
CS Dep. Chem., Univ. North Carolina, Chapel Hill, NC 27599-3290 USA
SO Biophysical Journal, (1996) Vol. 70, No. 2 PART 2, pp. A428.
Meeting Info.: 40th Annual Meeting of the Biophysical Society Baltimore, Maryland, USA February 17-21, 1996
ISSN: 0006-3495.
DT Conference
LA English

L6 ANSWER 6 OF 19 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 1993:495855 BIOSIS
DN PREV199396119862
TI **Fluorescence correlation spectroscopy** with high count rate and low background: Analysis of translational diffusion.
AU Rigler, R. (1); Mets, U.; Widengren, J.; Kask, P.
CS (1) Karolinska Inst., Dep. Medical Biophysics, S-10401 Stockholm Sweden
SO European Biophysics Journal, (1993) Vol. 22, No. 3, pp. 169-175.
ISSN: 0175-7571.
DT Article
LA English
AB An epi-illuminated microscope configuration for use in **fluorescence correlation spectroscopy** in bulk solutions has been analyzed. For determining the effective sample dimensions the spatial distribution of the molecule detection efficiency has been computed and conditions for achieving quasi-cylindrical sample shape have been derived. Model experiments on translational diffusion of rhodamine 6G have been carried out using strong focusing of the laser beam, small pinhole size and an avalanche photodiode in single photon counting mode as the detector. A considerable decrease in background light intensity and measurement time has been observed. The background light is 40 times weaker than the fluorescence signal from one molecule of Rh6G, and the correlation function with signal-to-noise ratio of 150 can be collected in 1 second. The effect of the shape of the sample volume on the **autocorrelation** function has been discussed.

L6 ANSWER 7 OF 19 MEDLINE DUPLICATE 3
AN 93144608 MEDLINE
DN 93144608 PubMed ID: 1489907
TI Motion of actin filaments in the presence of myosin heads and ATP.
AU Burlacu S; Borejdo J
CS Baylor Research Institute, Baylor University Medical Center, Dallas, Texas 75226.
NC AR-40095-01 (NIAMS)
SO BIOPHYSICAL JOURNAL, **(1992 Dec)** 63 (6) 1471-82.
Journal code: 0370626. ISSN: 0006-3495.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 199303
ED Entered STN: 19930312
Last Updated on STN: 19930312
Entered Medline: 19930301
AB We measured, by **fluorescence correlation spectroscopy**, the motion of actin filaments in solution during hydrolysis of ATP by acto-heavy meromyosin (acto-HMM). The method relies on the fact that the intensity of fluorescence fluctuates as fluorescently labeled actin filaments enter and leave a small sample volume. The rapidity of these number fluctuations is characterized by the **autocorrelation** function, which decays to 0 in time that is

related to the average velocity of translation of filaments. The time of decay of the **autocorrelation** function of bare actin filaments in solution was 10.59 +/- 0.85 s. Strongly bound (rigor) heads slowed down the diffusion. Direct observation of filaments under an optical microscope showed that addition of HMM did not change the average length or flexibility of actin filaments, suggesting that the decrease in diffusion was not due to a HMM-induced change in the shape of filaments. Rather, slowing down of translational motion was caused by an increase in the volume of the diffusing complex. Surprisingly, the addition of ATP to acto-HMM accelerated the motion of actin filaments. The acceleration was the greatest at the low molar ratios of HMM:actin. Direct observation of filaments under an optical microscope showed that in the presence of ATP the average length of filaments did not change and that the filaments became stiffer, suggesting that acceleration of diffusion was not due to an ATP-induced increase in flexibility of filaments. These results show that some of the energy of splitting of ATP is impaired to actin filaments and suggest that 0.06 +/- 0.02 of HMM interferes with the diffusion of actin filaments during hydrolysis of ATP.

L6 ANSWER 8 OF 19 MEDLINE DUPLICATE 4
AN 93042726 MEDLINE
DN 93042726 PubMed ID: 1420920
TI Studies on the structure of actin gels using time correlation spectroscopy of fluorescent beads.
AU Qian H; Elson E L; Frieden C
CS Department of Biochemistry and Molecular Biophysics, Washington University School of Medicine, St. Louis, Missouri 63110.
NC DK-13332 (NIDDK)
GM-38838 (NIGMS)
SO BIOPHYSICAL JOURNAL, **(1992 Oct)** 63 (4) 1000-10.
Journal code: 0370626. ISSN: 0006-3495.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 199212
ED Entered STN: 19930122
Last Updated on STN: 19970203
Entered Medline: 19921211
AB **Fluorescence correlation spectroscopy** (FCS) has been used to measure the diffusion of fluorescently labeled beads in solutions of polymerized actin or buffer. The results, obtained at actin concentrations of 1 mg/ml, show that small beads (0.09 micron in diameter) diffuse nearly as rapidly in the actin gel as in buffer, whereas the largest beads tested (0.5 micron in diameter) are immobilized. Measured **autocorrelation** times for motions of beads with intermediate sizes show that the diffusion is retarded (relative to buffer) and that the time behavior cannot be represented as a single diffusive process. In addition to the retarded diffusion observed over distances > 1 micron, 0.23-micron beads also show a faster motion over smaller distances. Based on the measured rate of this faster motion, we estimate that the beads may be constrained within a cage approximately 0.67 micron on a side, equal to a filament length of approximately 250 subunits. **Fluorescence correlation spectroscopy** measurements made in the same small spot (radius of 1.4 microns) of the gel vary over time. From the variations of both the **autocorrelation** functions and the mean fluorescence, we conclude that, corresponding to a spatial scale of 1.4 microns, the actin gel is a dynamic structure with slow rearrangement of the gel occurring over periods of 20-50 s at 21-22 degrees C. This rearrangement may result from local reorganization of the actin matrix. Data for the retardation of beads by the actin gel are consistent with a detailed theory of the diffusion of particles through solutions of rigid rods that have longitudinal diffusion coefficients much less than that of the particles (Ogston, A. G., B. N. Preston, and J. D. Wells. 1973.

Proc. R. Soc. Lond. A. 333:297-316).

L6 ANSWER 9 OF 19 MEDLINE DUPLICATE 5
AN 90344987 MEDLINE
DN 90344987 PubMed ID: 2383634
TI On the measurement of particle number and mobility in nonideal solutions by **fluorescence correlation spectroscopy**.
AU Abney J R; Scalettar B A; Hackenbrock C R
CS Department of Cell Biology and Anatomy, University of North Carolina, Chapel Hill 27599-7090.
SO BIOPHYSICAL JOURNAL, **(1990 Jul)** 58 (1) 261-5.
Journal code: 0370626. ISSN: 0006-3495.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 199009
ED Entered STN: 19901026
Last Updated on STN: 19901026
Entered Medline: 19900920
AB Interparticle interactions are incorporated into the theoretical description of the initial amplitude, G(0), of the normalized **fluorescence correlation spectroscopy autocorrelation** function. Measurements of particle number, aggregate size, and interaction-dependent diffusion are then analyzed in the context of this generalized theory. It is shown that the neglect of interactions can introduce order-of-magnitude errors into estimates of particle number and aggregate size. It is also shown that measurement of G(0) provides an essentially unique method for testing the validity of theories of interaction-dependent membrane protein diffusion.

L6 ANSWER 10 OF 19 MEDLINE DUPLICATE 6
AN 91198461 MEDLINE
DN 91198461 PubMed ID: 2085652
TI On the statistics of **fluorescence correlation spectroscopy**.
AU Qian H
CS Department of Biochemistry and Molecular Biophysics, Washington University School of Medicine, St. Louis, MO 63110.
NC GM38838 (NIGMS)
SO BIOPHYSICAL CHEMISTRY, **(1990 Oct)** 38 (1-2) 49-57.
Journal code: 0403171. ISSN: 0301-4622.
CY Netherlands
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 199105
ED Entered STN: 19910607
Last Updated on STN: 19910607
Entered Medline: 19910520
AB I present a detailed statistical analysis of **fluorescence correlation spectroscopy** (FCS) which is a natural extension of an early work. This analysis more realistically takes account of the following issues. (1) A spatial Gaussian laser excitation of fluorescence, (2) the effect of a small number of fluorescent molecules in the observation volume, (3) the shot noise effect due to random emission of fluorescent photons, and (4) a hyperbolic form for the fluorescence **autocorrelation** function obtained in the case of diffusion. Based on these assumptions, the results differ from the earlier work in several respects, in particular, the dependence of the signal-to-noise ratio on sample concentration and the understanding of shot noise in fluorescence fluctuation moments.

L6 ANSWER 11 OF 19 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.

AN 1989:197075 BIOSIS
DN BR36:97524
TI CONCENTRATIONS AND FLUORESCENT YIELDS OF DISTINCT CHEMICAL COMPONENTS IN MIXTURES MEASURED BY HIGH ORDER **AUTOCORRELATION** IN **FLUORESCENCE CORRELATION SPECTROSCOPY.**
AU PALMER A G III; THOMPSON N L
CS DEP. CHEM., UNIV. N.C., CHAPEL HILL, N.C. 27599-3290, USA.
SO THIRTY-THIRD ANNUAL MEETING OF THE BIOPHYSICAL SOCIETY, CINCINNATI, OHIO, USA, FEBRUARY 12-16, 1989. BIOPHYS J. (1989) 55 (2 PART 2), 191A. CODEN: BIOJAU. ISSN: 0006-3495.
DT Conference
FS BR; OLD
LA English

L6 ANSWER 12 OF 19 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 1988:213088 BIOSIS
DN BR34:106098
TI MOLECULAR AGGREGATION CHARACTERIZED BY HIGH ORDER **AUTOCORRELATION** IN **FLUORESCENCE CORRELATION SPECTROSCOPY.**
AU PALMER A G III; THOMPSON N L
CS DEP. CHEM., UNIV. NORTH CAROLINA AT CHAPEL HILL, CHAPEL, HILL, NC 27599-3290.
SO THIRTY-SECOND ANNUAL MEETING OF THE BIOPHYSICAL SOCIETY, PHOENIX, ARIZONA, USA, FEBRUARY 28-MARCH 3, 1988. BIOPHYS J. (1988) 53 (2 PART 2), 478A. CODEN: BIOJAU. ISSN: 0006-3495.
DT Conference
FS BR; OLD
LA English

L6 ANSWER 13 OF 19 MEDLINE DUPLICATE 7
AN 87157946 MEDLINE
DN 87157946 PubMed ID: 3828464
TI Theory of sample translation in **fluorescence correlation spectroscopy**.
AU Palmer A G 3rd; Thompson N L
NC GM-37145 (NIGMS)
SO BIOPHYSICAL JOURNAL, **(1987 Feb)** 51 (2) 339-43. Journal code: 0370626. ISSN: 0006-3495.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 198705
ED Entered STN: 19900303
Last Updated on STN: 19970203
Entered Medline: 19870504
AB New applications of the technique of **fluorescence correlation spectroscopy** (FCS) require lateral translation of the sample through a focused laser beam (Peterson, N.O., D.C. Johnson, and M.J. Schlesinger, 1986, Biophys. J., 49:817-820). Here, the effect of sample translation on the shape of the FCS **autocorrelation** function is examined in general. It is found that if the lateral diffusion coefficients of the fluorescent species obey certain conditions, then the FCS **autocorrelation** function is a simple product of one function that depends only on transport coefficients and another function that depends only on the rate constants of chemical reactions that occur in the sample. This simple form should allow manageable data analyses in new FCS experiments that involve sample translation.

L6 ANSWER 14 OF 19 MEDLINE DUPLICATE 8
AN 88025392 MEDLINE
DN 88025392 PubMed ID: 3663831
TI Molecular aggregation characterized by high order **autocorrelation**

in **fluorescence correlation spectroscopy**.
AU Palmer A G 3rd; Thompson N L
CS Department of Chemistry, University of North Carolina at Chapel Hill 27514.
NC GM-37145 (NIGMS)
SO BIOPHYSICAL JOURNAL, **(1987 Aug)** 52 (2) 257-70.
Journal code: 0370626. ISSN: 0006-3495.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 198711
ED Entered STN: 19900305
Last Updated on STN: 19970203
Entered Medline: 19871127
AB The use of high order **autocorrelation** in **fluorescence correlation spectroscopy** for investigating aggregation in a sample that contains fluorescent molecules is described. Theoretical expressions for the fluorescence fluctuation **autocorrelation** functions defined by gm,n(tau) = [(delta fm(t + tau)delta fm(t] - (delta Fm(t] (delta Fn(t]]/(F)m+n, where delta F(t) is the fluorescence fluctuation at time t, (F) is the average fluorescence, and m and n are integers less than or equal to 3, are derived. Methods for determining the number densities and relative fluorescence yields of aggregates of different sizes from a series of Gm,n(0) values are outlined. The method is applied to 1,1'-dioctadecyl-3,3,3',3'-tetramethylindocarbocyanine perchlorate suspended in solutions of water and ethyl alcohol. The technique presented may prove useful in detecting and characterizing aggregates of fluorescent-labeled biological molecules such as cell surface receptors.

L6 ANSWER 15 OF 19 MEDLINE
AN 87190203 MEDLINE
DN 87190203 PubMed ID: 3106023
TI **Fluorescence correlation spectroscopy** in the nanosecond time range: rotational diffusion of bovine carbonic anhydrase B.
AU Kask P; Piksarv P; Mets U; Pooga M; Lippmaa E
SO EUROPEAN BIOPHYSICS JOURNAL, **(1987)** 14 (4) 257-61.
Journal code: 8409413. ISSN: 0175-7571.
CY GERMANY, WEST: Germany, Federal Republic of
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 198706
ED Entered STN: 19900303
Last Updated on STN: 19970203
Entered Medline: 19870608
AB A fluorescence correlation experiment for measurement of rotational diffusion in the nanosecond time scale is described. Using this method, the rotational diffusion coefficient of bovine carbonic anhydrase B labelled with tetramethylrhodamine isothiocyanate was estimated to be Dr = (1.14 +/- 0.15) X 10(7) s-1 at 22 degrees C. The experiment is based on a cw argon ion laser, a microfluorometer with local solution flow inside the sample cell, and two photon detectors. The fluorescence intensity **autocorrelation** function in the nanosecond time range is computed with the help of a time-to-amplitude converter and a multichannel pulse-amplitude analyser.

L6 ANSWER 16 OF 19 MEDLINE DUPLICATE 9
AN 86026651 MEDLINE
DN 86026651 PubMed ID: 4052573
TI On the rotational brownian motion of a bacterial idle motor. II. Theory of **fluorescence correlation spectroscopy**.

AU Hoshikawa H; Asai H
SO BIOPHYSICAL CHEMISTRY, **(1985 Aug)** 22 (3) 167-72.
Journal code: 0403171. ISSN: 0301-4622.
CY Netherlands
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 198511
ED Entered STN: 19900321
Last Updated on STN: 19900321
Entered Medline: 19851125
AB The photon flux **autocorrelation** function of a fluorescent label attached to a bacterial motor shaft is calculated for the case in which the bacterial motor is considered to be actively but idly rotating. It is shown that even when the fluorescent label has a very short lifetime, **fluorescence correlation spectroscopy** should provide a useful tool for determining the rate of revolution of the bacterial motor under various solution conditions.

L6 ANSWER 17 OF 19 MEDLINE DUPLICATE 10
AN 83283675 MEDLINE
DN 83283675 PubMed ID: 6882857
TI Immunoglobulin surface-binding kinetics studied by total internal reflection with **fluorescence correlation spectroscopy**.
AU Thompson N L; Axelrod D
NC HL24039 (NHLBI)
NS14565 (NINDS)
SO BIOPHYSICAL JOURNAL, **(1983 Jul)** 43 (1) 103-14.
Journal code: 0370626. ISSN: 0006-3495.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 198310
ED Entered STN: 19900319
Last Updated on STN: 19970203
Entered Medline: 19831008
AB An experimental application of total internal reflection with **fluorescence correlation spectroscopy** (TIR/FCS) is presented. TIR/FCS is a new technique for measuring the binding and unbinding rates and surface diffusion coefficient of fluorescent-labeled solute molecules in equilibrium at a surface. A laser beam totally internally reflects at the solid-liquid interface, selectively exciting surface-adsorbed molecules. Fluorescence collected by a microscope from a small, well-defined surface area approximately 5 micron2 spontaneously fluctuates as solute molecules randomly bind to, unbind from, and/or diffuse along the surface in chemical equilibrium. The fluorescence is detected by a photomultiplier and autocorrelated on-line by a minicomputer. The shape of the **autocorrelation** function depends on the bulk and surface diffusion coefficients, the binding rate constants, and the shape of the illuminated and observed region. The normalized amplitude of the **autocorrelation** function depends on the average number of molecules bound within the observed area. TIR/FCS requires no spectroscopic or thermodynamic change between dissociated and complexed states and no extrinsic perturbation from equilibrium. Using TIR/FCS, we determine that rhodamine-labeled immunoglobulin and insulin each nonspecifically adsorb to serum albumin-coated fused silica with both reversible and irreversible components. The characteristic time of the most rapidly reversible component measured is approximately 5 ms and is limited by the rate of bulk diffusion. Rhodamine-labeled bivalent antibodies to dinitrophenyl (DNP) bind to DNP-coated fused silica virtually irreversibly. Univalent Fab fragments of these same antibodies appear to specifically bind to

DNP-coated fused silica, accompanied by a large amount of nonspecific binding. TIR/FCS is shown to be a feasible technique for measuring absorption/desorption kinetic rates at equilibrium. In suitable systems where nonspecific binding is low, TIR/FCS should prove useful for measuring specific solute-surface kinetic rates.

L6 ANSWER 18 OF 19 MEDLINE DUPLICATE 11
AN 81063249 MEDLINE
DN 81063249 PubMed ID: 6254568
TI The use of **fluorescence correlations spectroscopy** to probe chromatin in the cell nucleus.
AU Sorscher S M; Bartholomew J C; Klein M P
SO BIOCHIMICA ET BIOPHYSICA ACTA, **(1980 Nov 14)** 610 (1) 28-46.
Journal code: 0217513. ISSN: 0006-3002.
CY Netherlands
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 198102
ED Entered STN: 19900316
Last Updated on STN: 19900316
Entered Medline: 19810226
AB All systems in thermodynamic equilibrium are subject to spontaneous fluctuations from equilibrium. For very small system, the fluctuations can be made apparent, and can be used to study the behavior of the system without introducing any external perturbations. The mean squared amplitude of these fluctuations contains information about the absolute size of the system. The characteristic time of the fluctuation **autocorrelation** function contains kinetic information. In the experiments reported here, these concepts are applied to the binding equilibrium between ethidium bromide and DNA, a system where the fluorescence properties of the dye greatly enhance the effect of spontaneous fluctuations in the binding equilibrium. Preliminary experiments employ well-characterized DNA preparations, including calif thymus DNa, SV40 DNA, and calf thymus nucleohistone particles. Additional measurements are described which have been made in small regions of individual nuclei, isolated from green monkey kidney cells, observing as few as 5000 dye molecules. The data indicate that the strength of dye binding increases in nuclei isolated from cells which have been stimulated to enter the cell growth cycle. The viscosity of nuclear material is inferred to be between one and two orders of magnitude greater than that of water, and it decreases as the cells leave the resting state and enter the cell growth cycle. Washing the nuclei also lowers the viscosity. These experiments demonstrate that **fluorescence correlation spectroscopy** can provide information at the subnuclear level that is otherwise unavailable.

L6 ANSWER 19 OF 19 BIOSIS COPYRIGHT 2003 BIOLOGICAL ABSTRACTS INC.
AN 1980:176865 BIOSIS
DN BA69:51861
TI MOTION OF MYOSIN FRAGMENTS DURING ACTIN ACTIVATED ATPASE **FLUORESCENCE CORRELATION SPECTROSCOPY** STUDY.
AU BOREJDO J
CS POLYMER DEP., WEIZMANN INST. SCI., REHOVOT, ISR.
SO BIOPOLYMERS, (1979) 18 (11), 2807-2820.
CODEN: BIPMAA. ISSN: 0006-3525.
FS BA; OLD
LA English
AB The rates of the translational motion of myosin fragments, heavy meromyosin (HMM), and heavy meromyosin subfragment-1 (HMM S-1) were measured during actin-activated ATPase reaction by the method of **fluorescence correlation spectroscopy**. This technique monitors the random fluctuations in the concentration of fluorescent molecules in an open volume which result from the

translational diffusion of the molecular species under observation. The statistical behavior of the fluctuations is represented in the form of the **autocorrelation** function, which is related to the translational diffusion coefficient of the fluoresenct molecules. The translational motion of fluorescently labeled myosin fragments was progressively slowed down after additions of increasing amounts of actin in the presence of excess MgATP. When these results are interpreted according to a simple binding scheme, the extent of the retardation can be used to obtain the apparent association constant for binding of S-1 and HMM to actin in the presence of MgATP. In 0.1 M KCl and at 23.degree. C, the apparent association constants were determined as .**GRAPHIC**. = 2.2 .times. 104 M-1 and .**GRAPHIC**. = 8.8 .times. 103 for HMM and S-1, respectively.

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